



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/655,997	09/05/2003	Jon P. Daley	MI22-2380	7524
21567	7590	03/11/2005	EXAMINER	
WELLS ST. JOHN P.S. 601 W. FIRST AVENUE, SUITE 1300 SPOKANE, WA 99201			PERKINS, PAMELA E	
			ART UNIT	PAPER NUMBER
			2822	

DATE MAILED: 03/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/655,997

**Applicant(s)**

DALEY, JON P.

**Examiner**

Pamela E. Perkins

**Art Unit**

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 05 September 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-71 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17, 19-50 and 52-70 is/are rejected.
- 7) ☒ Claim(s) 18, 51 and 71 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 05 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 9/03; 8/04; 10/04.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This office action is in response to the filing of the application papers on 8 September 2003. Claims 1-71 are pending.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3, 8-11, 14, 15, 17, 19, 20-38, 41-44, 47, 48, 50, 52-64, 67, 68 and 70 are rejected under 35 U.S.C. 102(b) as being anticipated by Duval (5,955,244).

Referring to claims 1, 30 and 53, Duval discloses a method of forming a patterned photoresist layer over a semiconductor substrate where an antireflective coating deposited over a semiconductor substrate (20), the antireflective coating having an outer surface (col. 7, lines 20-25); treating the outer surface with a basic fluid (col. 7, lines 25-29); applying a photoresist onto the outer surface which has been treated with the basic treating fluid (col. 7, lines 34-41); and patterning and developing the photoresist effective to form a patterned photoresist layer (22) (col. 8, lines 1-14) having increased footing at a base region of the layer than would otherwise occur in the absence of the treating the outer surface (col. 7, lines 58-63).

Referring to claims 2, 37 and 60, Duval discloses the outer surface as organic (col. 7, lines 20-23).

Art Unit: 2822

Referring to claims 3, 38 and 61, Duval discloses the outer surface as inorganic (col. 4, lines 30-34).

Referring to claims 8 and 41, Duval discloses the outer surface comprising silicon carbide (col. 4, lines 30-34).

Referring to claims 9, 10, 42, 43, 62 and 63, Duval discloses the basic treating fluid has a pH of at least 10.5 (col. 2, lines 62-63).

Referring to claims 11, 27, 35, 44, 58 and 64, Duval discloses the basic treating fluid is liquid (col. 5, lines 59-61).

Referring to claims 14, 47 and 67, Duval discloses the basic treating fluid comprises potassium hydroxide (col. 5, lines 5-14).

Referring to claims 15, 48 and 68, Duval discloses the basic treating fluid comprises sodium hydroxide (col. 5, lines 5-14).

Referring to claims 17, 50 and 70, Duval discloses the basic treating fluid comprises an alkyl amine (col. 5, lines 26-44).

Referring to claims 19 and 20, Duval discloses treating is for no more than 1 minute (col. 5, lines 65-67).

Referring to claims 21 and 53, Duval discloses the photoresist as a positive photoresist (col. 7, lines 37-38).

Referring to claim 22, Duval discloses the photoresist as a negative photoresist (col. 7, line 40).

Referring to claims 23, 31 and 54, Duval discloses not exposing the outer surface to any liquid intermediate the treating and the applying (col. 4, lines 50-60).

Art Unit: 2822

Referring to claims 24, 25, 28, 32, 33, 36, 55, 56 and 59, Duval discloses drying outer surface intermediate the treating and the applying (col. 5, line 67 thru col.6, line 4).

Referring to claims 26, 34 and 57, Duval discloses not exposing the outer surface to any liquid intermediate the treating and the applying; and the outer surface is at least partially dried intermediate the treating and the applying (col. 4, lines 50-60; col. 5, line 67 thru col. 6, line 4).

Referring to claims 29 and 52, Duval discloses the outer surface is reflective of incident radiation used in said patterning of the photoresist (col. 3, lines 29-41).

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-7, 12, 39, 40, 45 and 65 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duval in view of Yin et al. (6,380,611).

Duval discloses the subject matter claimed above except the basic treating fluid is gaseous.

Yin et al. disclose a method of forming a patterned photoresist layer over a semiconductor substrate where an antireflective coating (7) deposited over a semiconductor substrate (1), the antireflective coating (7) having an outer surface (col. 5, line 66 thru col. 8, line 3); treating the outer surface (col. 8, lines 50-59); applying a

Art Unit: 2822

photoresist (3) onto the outer surface which has been treated (col. 9, lines 42-56); and patterning and developing the photoresist effective to form a patterned photoresist layer (col. 9, lines 57-60).

Referring to claims 12, 45 and 65, Yin et al. disclose the treating fluid as gaseous (col. 8, lines 50-53).

Since Duval and Yin et al. are both from the same field of endeavor, a method of forming a patterned photoresist layer over a semiconductor substrate, the purpose disclosed by Yin et al. would have been recognized in the pertinent art of Duval. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Duval by the basic treating fluid is gaseous as taught by Yin et al. to provide an accurate mask for subsequent layers (col. 2, lines 5-31).

Referring to claims 4-7, 39 and 40, Yin et al. disclose the outer surface comprising a nitride, silicon nitride, titanium nitride and silicon dioxide (col. 8, lines 3-16).

Claims 13, 46 and 66 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duval in view of Oberlander et al. (6,844,131).

Duval discloses the subject matter claimed above except the basic treating fluid comprising tetramethyl ammonium hydroxide.

Oberlander et al. disclose a method of forming a patterned photoresist layer over a semiconductor substrate where an antireflective coating deposited over a semiconductor substrate, the antireflective coating having an outer surface; treating the

Art Unit: 2822

outer surface; and applying a photoresist onto the outer surface which has been treated (col. 13, lines 8-32).

Referring to claims 13, 46 and 66, Oberlander et al. disclose treating the outer surface with tetramethyl ammonium hydroxide (col. 14, lines 2-15).

Since Duval and Oberlander et al. are both from the same field of endeavor, a method of forming a patterned photoresist layer over a semiconductor substrate, the purpose disclosed by Oblerlander et al. would have been recognized in the pertinent art of Duval. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Duval by treating the outer surface with tetramethyl ammonium hydroxide as taught by Oblander et al. to optimize the photoresist (col. 13, lines 25-29).

Claims 16, 49 and 69 are rejected under 35 U.S.C. 103(a) as being unpatentable over Duval in view of Sahbari (6,350,560).

Duval discloses the subject matter claimed above except the basic treating fluid comprising ammonium fluoride.

Sahbari discloses a method of forming a patterned photoresist layer over a semiconductor substrate where an antireflective coating deposited over a semiconductor substrate, the antireflective coating having an outer surface; and treating the outer surface (col. 2, lines 64-67).

Referring to claims 16, 49 and 69, Sahbari discloses treating the other surface with ammonium fluoride (col. 1, line 65 thru col. 2, line 1).

Since Duval and Sahbari are both from the same field of endeavor, a method of forming a patterned photoresist layer over a semiconductor substrate, the purpose disclosed by Sahbari would have been recognized in the pertinent art of Duval. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Duval by treating the other surface with ammonium fluoride as taught by Sahbari to prevent corrosion of the substrate (col. 2, lines 43-51).

#### ***Allowable Subject Matter***

Claims 18, 51 and 71 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: prior art does not anticipate, teach, or suggest performing the basic treating fluid is at room ambient temperature and room ambient pressure.

#### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pamela E. Perkins whose telephone number is (571) 272-1840. The examiner can normally be reached on Monday thru Friday, 9:00am to 5:30pm.

Art Unit: 2822

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

PEP

  
AMIR ZARABIAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800